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LETTER

Association between Hypoxia, Sleep, and the Circadian System during Long-Haul Flights. A Commentary [Letter]

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Dear editor

We would like to comment on the paper by Elmenhorst et al[1] regarding the quality of a short nocturnal sleep episode in double aircrews on commercial ultra-long-haul flights.

The study's goal was to assess the effects of mild hypobaric hypoxia at a simulated 8000 ft altitude. The authors discovered that hypoxia had a significant impact on sleep with an increase in N2 sleep and a rise in heart rate, the effects were reversible once the hypoxia was corrected with enriched O_2 air inhalation.

A study limitation is the absence of any daytime hypoxic exposure during the waking period preceding the actual study when the objective was to study ultra-long-haul flights when hypoxia is present. Hypoxia can occur during the waking period of a long-distance flight; unfortunately, the authors did not plan for or discuss this though data do exist in the literature.

Indeed, we documented on a circadian basis the effects of 8-hr mild hypobaric hypoxia simulating a flight in a pressurized cabin. Following this hypoxic exposure, we discovered a phase delay in the core body temperature rhythm, and changes in melatonin and cortisol circadian rhythms which could explain, at least in part, subjective complaints of poor recovery sleep quality.[2–4] Last, the effects of hypoxia on sleep architecture as measured by polysomnography allowed to show an increase in sleep onset latency and sleep fragmentation, and a reduction in the total sleep period, during the two nights following the hypoxic exposure.[5]

These findings complement and shed light on potential mechanisms for the effects of hypoxia on sleep, although the experimental design of the studies differs. To make a realistic inventory of aircrews' sleep quality on long and ultra-long-haul flights, we believe it is necessary to factor in hypoxia's alteration of the circadian time structure.

Disclosure

The authors declare no conflicts of interest in this communication.

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